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入侵紅火蟻與餌劑處理對於當地螞蟻多樣性的影響－以台北大學三峽校區為例

The Impact of the Red Imported Fire Ant, Solenopsis invicta, and Bait Treatment on the Diversity of Native Ants-a Case Study at National Taipei University, Sanshia Campus

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中文摘要

本研究利用台北大學三峽校區入侵紅火蟻撲滅計畫所蒐集之資料進行分析。以掉落式陷阱定量估計當地火蟻及其他螞蟻的活動量，每間隔 2～4 個月進行一次調查，每次調查後，使用火蟻餌劑 (後所稱餌劑皆指百利普芬；pyripoxyfen) 進行入侵紅火蟻防治，共累積 14 次調查記錄。本研究從中挑選四次調查資料，分別為防治前資料 (before controlling period, B period)、防治進行中 (controlling period, C period)、防治後 (after controlling period, A period) 以及防治末期 (termination period, T period) 進行研究。結果顯示於防治開始後，入侵紅火蟻 (簡稱為火蟻) 的族群數量大幅下降，直至本研究結束時仍沒有回升。其他當地螞蟻物種於使用藥劑防治入侵紅火蟻後，整體的物種豐度 (richness) 與個體數量 (abundance) 受到中等但不顯著之衝擊。以多樣性指數分析，發現防治後當地螞蟻群落多樣性明顯降低，但逐漸有回升的趨勢。直到研究結束為止，多樣性指數仍未達研究初期之水準。當火蟻消失後，當地螞蟻相於持續撒佈餌劑下，雖不能達到防治前期之高峰，但仍顯示出恢復之潛力。從上述資料可推論餌劑的使用確能減輕入侵紅火蟻對於當地螞蟻多樣性衝擊，對維持當地螞蟻群落組成具有正面的助益。此結果顯示，適當使用餌劑進行防治，對當地螞蟻相的影響，比不使用餌劑控制而放任火蟻族群增長還要小。若能根據火蟻密度調查，調整餌劑使用量或施用時期，或者在防治末期，採取不同於餌劑撒佈的防治策略，例如嘗試培植當地具競爭力之螞蟻與火蟻競爭，取代密集的餌劑撒佈，應可控制火蟻數量及蔓延，有機會進行分區撲滅，逐步達成撲滅火蟻的目標。

關鍵字：入侵紅火蟻; 生物多樣性; 當地螞蟻相; 火蟻餌劑

Abstract

The data for this study was generated from the pilot study for the eradication program of the red imported fire ant (*Solenopsis invicta*, RIFA) that was carried out on Sanshia campus of the National Taipei University. The numbers of RIFA and local ants were monitored by pitfall traps at 2 to 4 month intervals followed by bait broadcasting. The data from 4 periods totalling 14 monitoring date was chosen and defined as the before control period (B period), the control period (C period), the after control period (A period) and the termination period (T period), respectively. The overall pattern of population dynamic suggested that the population of RIFA declined rapidly after control was initiated and remained suppressed for the duration of this study. The abundance of local ants on the campus grounds did not seem to be affected when the RIFA were being controlled by bait broadcasting. Based on three different diversity indices, the level of the local ant populations decreased significantly directly after treatment and then gradually and slowly increased again. However, it never reached the level of the initial invasion. Thus, once the RIFA were almost eliminated, the local ant community were able to revive themselves, even under the presence of bait (pyripoxyfen), although their level did not reach the same numbers as before. This phenomenon may be an indication that the impact of RIFA to local ant diversity is much more critical than of any bait application. Compared with the devastation caused by the invasion of RIFA, using bait to control RIFA appropriately may be the only acceptable choice. Based on an investigation of RIFA density, even when adjusted for volume and timing of the bait application, introducing a different strategy such as conservation of competitive native ant species can not only prevent the unrecoverable damage to the diversity of the native ant population, but it also offers us a chance to eradicate the RIFA.

Key words：Solenopsis invicta; Red imported fire ant; Biodiversity; Ant fauna; Fire-ant bait